**Whitesides Outline Template**

**Working Title:**  
Animal Detection for Saving Nature

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**Unmet Need:**  
annotated videos (still exploring annotation tool)

**Hypothesis/Goal/Aim:**  
Saving nature is a non-profit organization with a specific mission to protect endangered animal species around the world and one of the ways in protecting the animals is to restore lands between forests. They had installed camera traps across different rainforests, and the camera trap is able to capture and record both images and videos triggered by motion. The visuals are currently examined one by one by the scientists. With the animals appear in the visuals, scientists could further study how effective is restoring lands in helping species regain their habitats. Our main goal is to automate the process of detecting animals in images and videos. Completing this would greatly reduce the need for human labor and It would help Saving Nature to examine their strategies for restoring lands back.

**Objectives with (short, one-sentence) justification:**  
(Should serve to revisit/update your storyboard)

**Audience:** Saving Nature

**Style:** (e.g. academic paper, white paper, or public-facing documents such as a blog) white paper

**Abstract**  
(Place holder; to be written only after the rest of the paper is complete and not in the outline)

**Introduction**

(For now, write only a brief introductory paragraph)

**Data Processing**

**Purpose:**  
Provide details on how we clean the data. First, the preliminary data cleaning is by our clients, who manually classify the raw camera trap images and videos by the animal species that is being captured, and separates them into folders with the species scientific name and metadata embedded in the file name.

Next, we will take over the cleaning of file names and directory in a way that is suitable for the data loader for our models. We also parse the directory and file name to extract relevant species taxonomy and metadata for analysis later.

After this, we will pass the cleaned data directory back to the clients, who will engage student volunteers to annotate the images with bounding boxes.

Lastly, we performed a final step train-Val-test split using 80:10:10 ratio. We did this by stratifying by animal species and camera traps, so as to ensure class balance across different levels.

This pipeline is applied to every location where the camera trap data is coming from.

**Methods**

\*\*Purpose: \*\*  
Introduce different concepts of methods we are considering for later model building.  
**Shortlist of studies/results to be done for the section:**

* Classification: Binary classes vs Multi-classes
* Detection
* data augmentation methods: downsampling, rescaling, rotation, cropping (automatic cropping)

**Algorithm Development**

**Purpose of the section:** Because of the previous section, we now implement different methods.  
**Shortlist of studies/results to be done for the section:**

* ResNet 18,50,101
* Fast R-CNN

**Results**

**Purpose of the section:** Display the performance of the models.

**Figures/tables:**  
(Actual mock-ups, hand-drawn/cartoons are ok to start)

**(Follow with as many sections as needed with appropriate titles)**

**Conclusion/Discussion**

(Place holder)